

**California Global Warming Solutions
Act of 2006
and
Changing Composition of
Air Pollution Emissions**

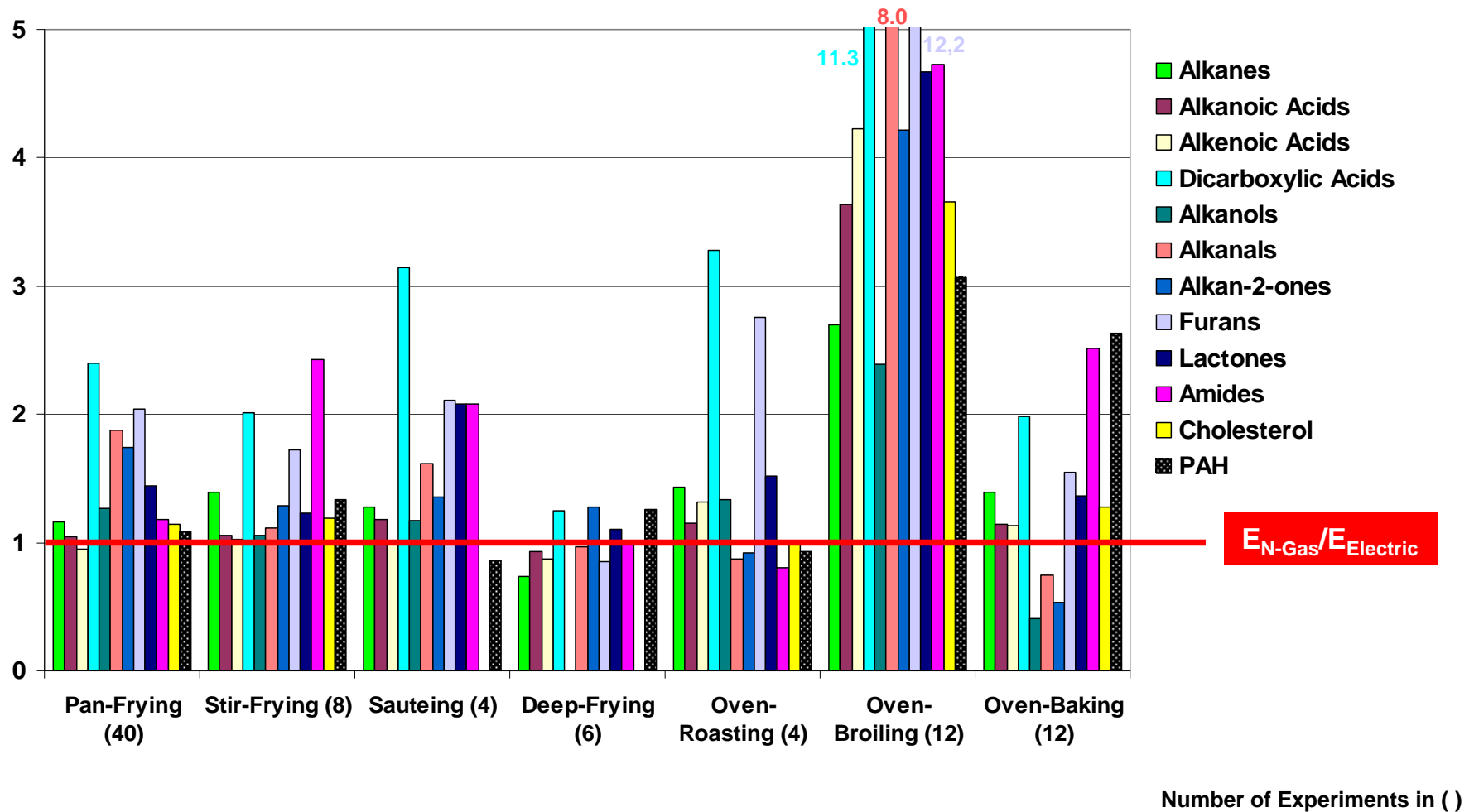
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Pollutant Sources Investigated

No.	Source Type	No.	Source Type
1	Cars	15	Roofing Tar Pot
2	Diesel Trucks	16	Restaurant Type Meat Cooking
3	Dual Fuel Power Cars	17	Residential Cooking for many Food Items
4	Traffic Tunnel (Pittsburgh)	18	Pine Logs burning in Fireplace
5	Urban Road Dust Pasadena	19	Oak Logs burning in Fireplace
6	Urban Road Dust Pittsburgh	20	Synthetic Logs burning in Fireplace
7	Urban Road Dust San Joaquin Valley, CA	21	Campfire burning of Pine Wood
8	Rural Road Dust San Joaquin Valley, CA	23	Thermal conversion of individual Biopolymers
9	Unpaved Road Dust San Joaquin Valley, CA	24	Leaf Surface Abrasions for Los Angeles Vegetation
10	Tire Wear Particles	25	Leaf Surface Abrasion for Pittsburgh Vegetation
11	Brake Lining Dust	26	Cigarette Smoke
12	Natural Gas Home Appliances	27	Fugitive Dust from Feedlots and Dairy Farms for San Joaquin Valley
13	Industrial Oil Boilers	28	Fugitive Dust from Crop Fields for San Joaquin Valley
14	Coke-Oven		

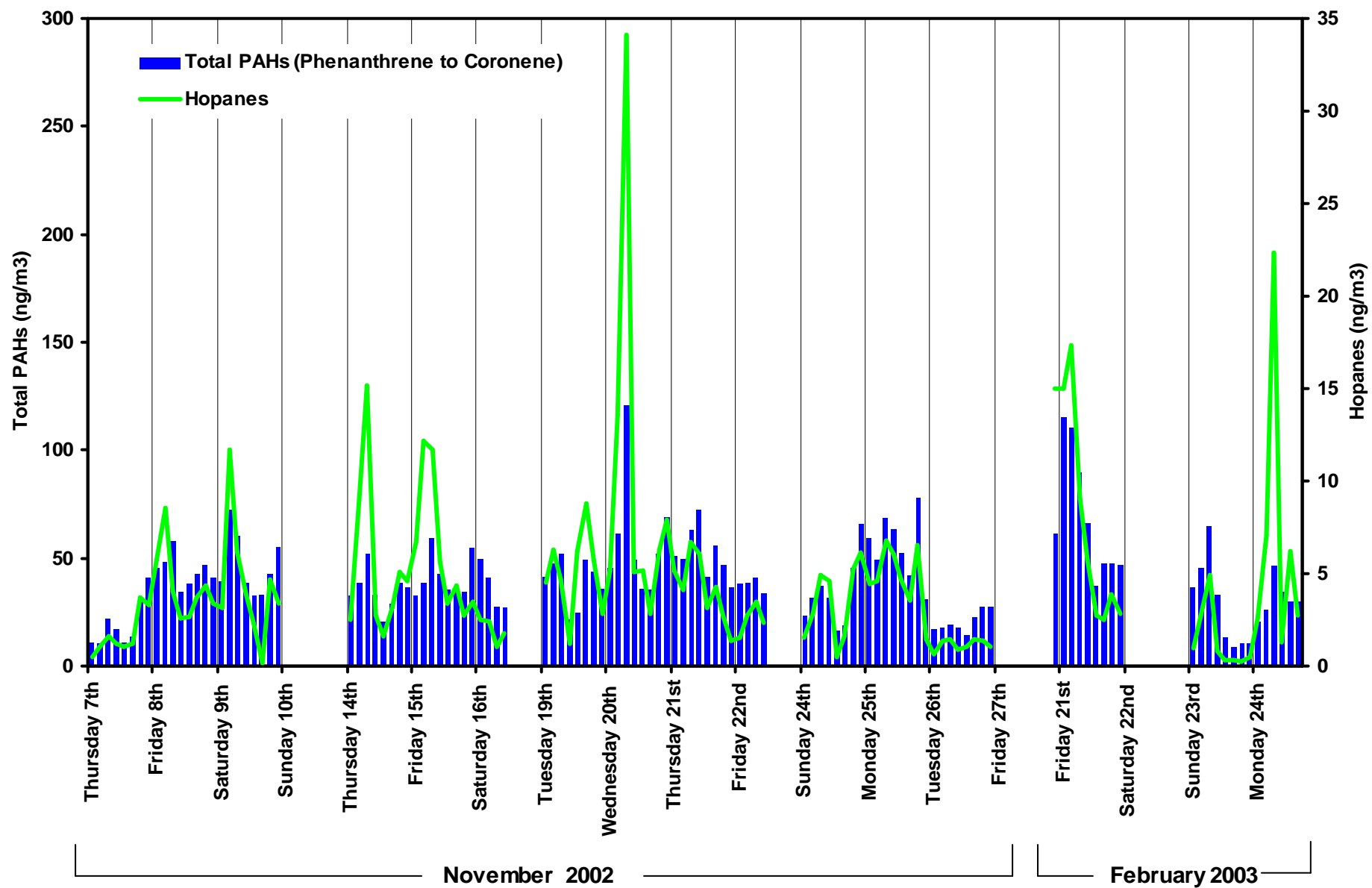
Cooking Fuel and Organic Compound Emissions: Natural Gas vs. Electric Cooking



Ambient Air Quality Studies

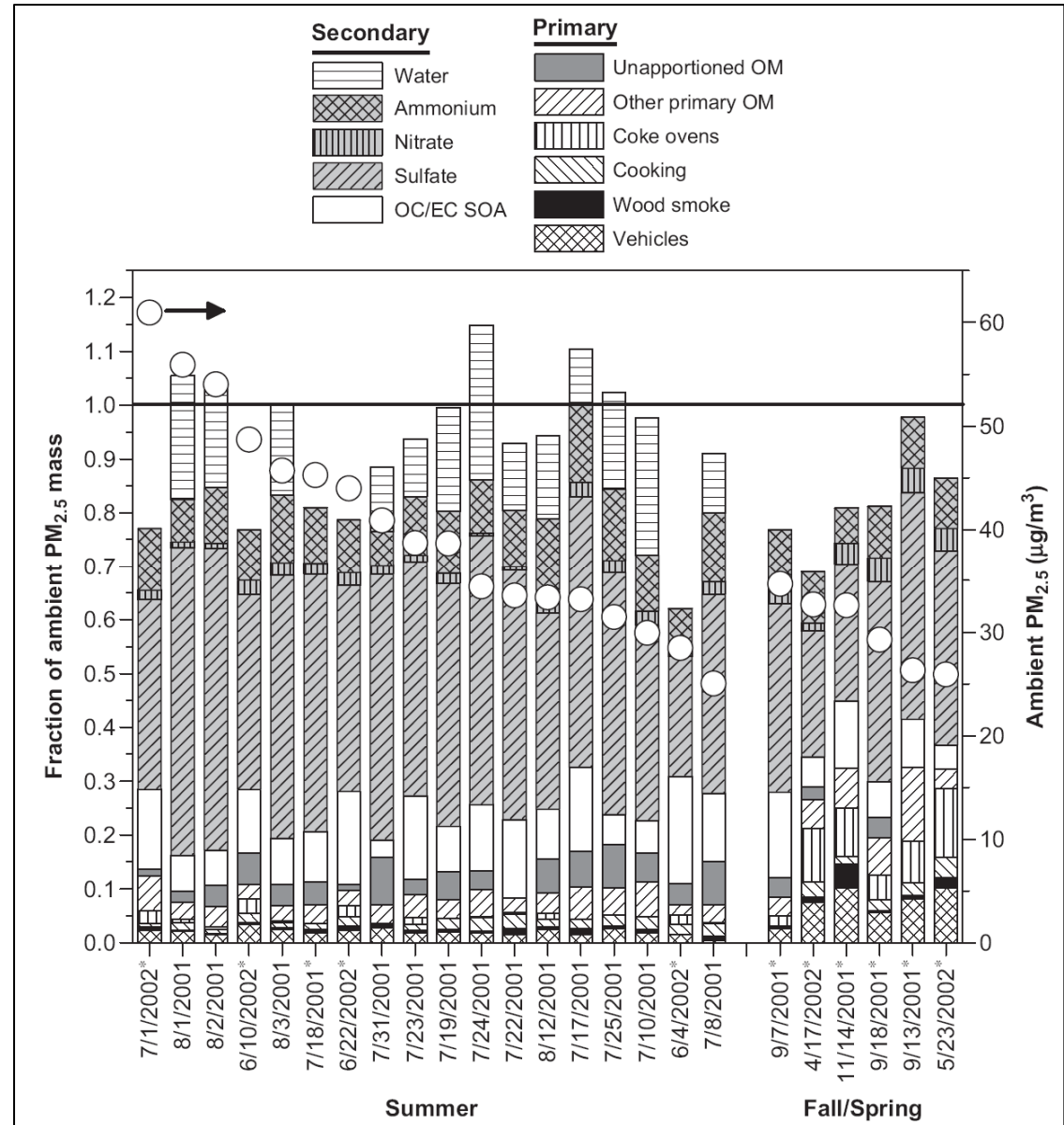
Location	Details
Greater Los Angeles Area - 1982	Five Locations, sampled PM _{2.1} every 5 th day for an entire Calendar Year (Cass & Gray) - 24hour-sampling
South Florida - 1996/97	Size-segregated PM, sampled every 5 th day for an entire Year - 24hour-sampling
Pittsburgh - 2001/02	Two Locations, sampled PM _{2.5} every 5 th day for more than 1 year plus intensive sampling campaigns
Baltimore - 2002/03	3-hourly PM _{2.5} sampling, three weeks in summer as well in winter

Baltimore: Vehicular Marker vs. Polycyclic Aromatic Hydrocarbons



Air Pollution Modeling

- Los Angeles
- Pittsburgh
- Baltimore



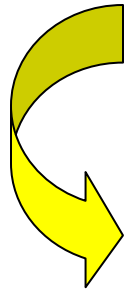
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Examples:

Transportation - Substituting Fossil Fuels with Biofuels

Power Plants - Substituting Fossil Fuels with
Agricultural/Forestry Biomass

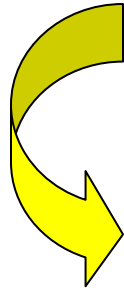
Biogas Plants - Methane Generation



Are exhaust emissions less or more toxic?

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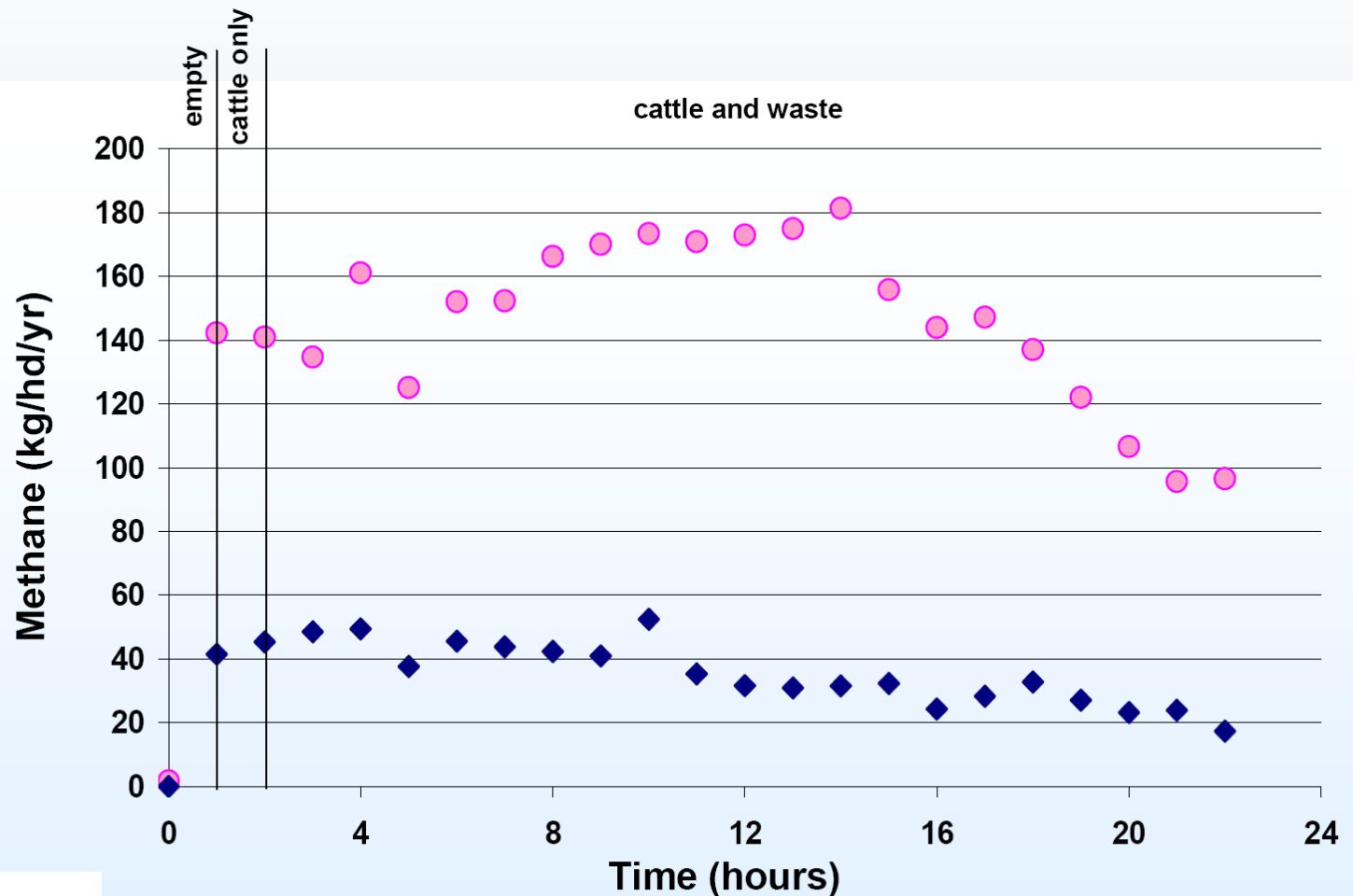
Examples: Goods Production/Industrial Processes



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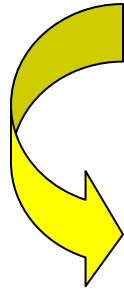
Examples: Methane Emission Factors for Dairy Cows vs. Beef Steers



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Examples: Changing Composition of Emissions



How does the atmospheric chemistry change and what impacts has it on human health and welfare?